UNIV-1100 SMS — First Year Seminar: Scientific Computing Learning Community

Fall 2012

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Office Hours: Monday, Firday 1:00–2:00, Thursday 8:30–10:00, and *and by appointment*. See the web for the most up-to-date office hours.

Class Schedule: Wed. 1:00–1:50pm, Aubie Hall 137.

Required Text: Required texts are licensed under a Creative Commons license and are freely available online. Links to material will be provided as needed.

Optional Text (2012–2013 Auburn Common Book):

- Skloot, Rebecca; The Immortal Life of Henrietta Lacks, Broadway Paperbacks, New York, 2010. ISBN: 978-1-4000-5218-9.

Online Resources:

- Auburn University Bulletin 2012–2013, available at www.auburn.edu/bulletin and Student Policy eHandbook available at www.auburn.edu/student_info/student_policies.
- Additional (course specific) reading material will be provided electronically during the semester (detailed instructions will be given), see auburn.instructure.com and itunesu.itunes.apple.com/enroll/J8K-WQH-YDC.

Course Description: Numerical simulations of physical phenomena have become standard practice in research & development, and engineering organizations. The increasing prevalence of numerical simulations and scientific computations is due not only to the increase in computing power (processor speed, multiple processing cores, size of physical memory, etc.) and the decrease in cost of computer hardware, but also due to the improvements in software and numerical algorithms. Moreover, physical experiments are increasingly being replaced or augmented by computer simulations which allow investigation of phenomena that are dangerous, or where physical experiments are unfeasible or impossible.

In this first year seminar we explore the centrality and prominence of computer simulation, discuss issues affecting the US leadership in innovation and competitiveness in science and technology, and survey various issues surrounding scientific computation and visualization.

Learning Outcomes: Students will

- demonstrate understanding and critical thinking skills surrounding the topic of Scientific Computing;
- demonstrate awareness of the effects of personal choices with respect to Scientific Computing;
- examine cultural differences and diversity among people, with emphasis on cross-cultural interaction and its impact on issues of Scientific Computing;
- examine and actively explore career/professional interests;
- demonstrate critical thinking skills through a variety of assignments involving reading, writing, speaking, and research;

and

- demonstrate ability to use library and internet resources to research and critically analyze information.

Course Requirements:

- Readings as assigned
- Homework and/or projects as assigned
- Quizzes
- Exams

Attendance Policy: Attendance will be taken at the beginning of each class period. Students are expected to attend all classes, except in the case of a University-approved excused absence (see the Student Policy eHandbook www.auburn.edu/student_info/student_policies). In the case of an expected absence, advance notice should be provided to the instructor as soon as such absence is known. Except in the case of a University-excused absence, it is the instructor's prerogative to deem an absence excused or unexcused. In the case of a University-excused absence, all assignments will be due at the beginning of the next class following the absence. One unexcused absence will be allowed. Each additional absence may result in a letter grade reduction (from the final grade) per absence. Each instance of tardiness may count as one-half of an unexcused absence.

Academic Honesty: Auburn University expects students to pursue their academic work with honesty and integrity. The Academic Honesty Code is available as part of the Student Policy eHandbook www.auburn.edu/student_info/student_policies and contains a list of those actions that are considered cheating and the possible consequences for code violations. Violations of the Academic Honesty Code will not be tolerated in this course.

Grading Policy: Homework and/or projects, quizzes, and two exams will make up 60%, 10%, and 30% (15% each exam) of the final grade, respectively. Letter grades will be assigned to students taking the class. The grading scale is 90–100%, 80–89%, 70–79%, 60–69%, and 0–59%, for letter grades of A, B, C, D, and F, respectively.

Class Participation Policy: Learning cannot take place if the learner is not present. Therefore, the student must come to class on time and be prepared to contribute to the classroom learning experience.

Reading assignments may occasionally be made from the course textbooks or other ancillary media. If such an assignment is made, it is expected that students will read the material and be prepared to discuss the reading assignment in class. Required texts are licensed under a Creative Commons license and are freely available online. Links to material will be provided as needed.

Exams and Quizzes: Two exams will be given, these will be administered either in class, or online using Canvas. Exams will cover assigned readings, class discussions, homework and/or projects, and guest presentations (if any), and are cumulative in nature. Several (two, or three) quizzes will be given in this class, and may be unannounced.

Late Assignments, Make-Up Assignments and Exams: Late work will not be graded. Arrangements for make-up assignments and exams must be made in advance unless they were missed due to an emergency, and will be subject to the policies as outlined in the Student Policy eHandbook (see www.auburn.edu/student_info/student_policies) and this syllabus. No make-up work will be accepted for unexcused absences.

Topics Covered (Note necessarily in order):

- Need for, and ubiquity of, computing.
- Overview of scientific computing and types of computing.
- Technicalities, hardware, linux, virtualization, and Python.
- Introduction to Python.
- TEX, LATEX, and typesetting in the sciences and engineering.
- Overview of visualization techniques.
- Examples of scientific and exploratory computing and scientific visualization.
- Introduction to Auburn University, a research university, and available services.
- Academic integrity and skills for success.
- Degrees, majors and careers, and planning for the future and achieving your goals.

Computer Accounts: You must have an active AU OIT computer account.
For computing, network infrastructure, and software support (and for general computer lab support) contact:

- Auburn University (Office of Information Technology, OIT Help Desk)
  844-4944, helpdesk@auburn.edu
- College of Engineering (Engineering Network Services)
  844-2280 admin@eng.auburn.edu
- College of Sciences and Mathematics (Office of Instructional Technology)
  844-5712, cosamithelp@auburn.edu

Student E-mail Policy: E-mail is considered an official medium for communicating with students. All students are responsible for checking their Auburn University issued e-mail account in a timely fashion and on a regular basis (at least once a day). Claiming not to have seen an e-mail message on time does not constitute a valid excuse. The official e-mail system for students is (the Auburn provided) user@auburn.edu (or user@tigermail.auburn.edu) and can be accessed via TigerMail (using a web browser), or IMAP clients.

Cell Phone Policy: Cell phones must be turned off during class and exam periods.

Registration: It is your responsibility to make sure that you are properly registered for this particular section of UNIV - 1150 (section SMS), Wednesday, 1:00–1:50pm, 137 Aubie Hall.

Accommodations: Students who need special accommodations should follow the guidelines at fp.auburn.edu/disability, electronically submit their approved accommodations through AU Access, and arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately (if you have a conflict with my office hours, an alternate time can be arranged). If you have not established accommodations through the Office of Accessibility, but need accommodations see fp.auburn.edu/disability or make an appointment with the Office of Accessibility, 1228 Haley Center, 844-2096.

Important Dates: First day of classes is Thursday August 16. Penalty days are August 23–September 6 (dropping a course during these days will result in a $100 Drop Fee per course dropped). Labor Day is Monday September 3. The 15th class day (last day to withdraw from a course with no grade assignment and for potential tuition refund for dropped classes) is Thursday September 6. Mid Semester (last day to withdraw from a course with no grade penalty; W assigned) is Friday October 5. Thanksgiving Break November 19–23. Classes end Friday November 30. Final Exam period December 3–7, and Graduation Saturday December 8.

Schedule (The schedule is subject to change at any time during the course of the semester. Changes will be announced in class, by e-mail, or on Canvas or iTunes U. Details will be added during the semester.):

***** Week 1**

Aug. 16: Classes begin

***** Week 2**

Aug. 22: LC class mtg.; Introduction and class overview.

***** Week 3**

Aug. 29: LC class mtg.; Introduction to Auburn University, a research university, and available services.

***** Week 4**

Sep. 3: Labor Day

Sep. 5: LC class mtg.; Overview of scientific computing and types of computing. Technicalities, hardware, linux, virtualization, and Python.

Sep. 6 15th Class Day

***** Week 5**

Sep. 12: LC class mtg.

***** Week 6**

Sep. 19: LC class mtg.

***** Week 7**

Sep. 26: LC class mtg.

***** Week 8**

Oct. 3: LC class mtg.; Exam 1

Oct. 5: Mid-Semester

***** Week 9**

Oct. 10: LC class mtg.

***** Week 10**

Oct. 17: LC class mtg.

***** Week 11**

Oct. 24: LC class mtg.

***** Week 12**

Oct. 31: LC class mtg.

***** Week 13**

Nov. 7: LC class mtg.

***** Week 14**

Nov. 14: LC class mtg.

***** Week 15**

Nov. 19–23: Thanksgiving Break

***** Week 16**

Nov. 28: LC class mtg.; Exam 2

Nov. 30: Classes end

***** Week 17**

Dec. 3–7: Final exam period

Dec. 8: Commencement
